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AUTHOR Downing, John; And Others
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ABSTRACT

The aim of this study was to test a hypothesis derived from the Cognitive Clarity Theory which compares Indian and non-Indian children in two localities of British Columbia. It was hypothesized that, in comparison with Indian children, the non-Indian children would show significantly superior performance on objective tests of cognitive clarity in learning to read. The subjects consisted of kindergarten children from two school districts. In District 1 all the Indian boys and girls were tested and compared with a sample of non-Indian boys and girls selected by random procedures. In District 2 the same sampling procedure was followed. Five subtests of the Canadian Reading Readiness battery were administered to the subjects. This test is experimental and contains the following subtests: orientation to literacy, understanding literacy behavior, technical language of literacy, visual letter recognition and letter-name knowledge, and initial phonemes. The results supported the hypothesis derived from the Cognitive Clarity Theory of learning to read. The Indian children were significantly less able to recognize the acts of reading and writing, their ability to recognize and name letters was significantly poorer, and their concepts of word and letter were significantly less than those of the non-Indian children. (WR)

A Cross-cultural Test of the Cognitive Clarity Theory of Reading

John Downing, Lloyd Ollila, and Peter Oliver

University of Victoria, Canada

Previous Research

Fitts and Posner (1967) concluded from their comprehensive review of the psychological research on skills that their development always involves three phases (1) the cognitive phase in which the learner comes to understand the nature of the task and develop concepts of its component parts,(2) the association of specific responses with the appropriate stimuli, and (3) making the performance of the skill automatic. Typically, phase 2 receives most attention from reading teachers. Phases 1 and 3 are often neglected. Neglect of phase 3 leads to the phenomenon which Downing (1973a) terms "ex-literacy." That is the loss of the ability to read by individuals who have ceased to practise reading and who have never overlearned the skill. Neglect of phase 1 causes the learner to enter phase 2 unready to handle the concepts and technical terms needed to talk and think about the written and spoken forms of language and the relations between them.

"Cognitive confusion" was first recognized as the most common symptom of reading disability by M.D. Vernon (1957). Later, Downing (1969) noted that if, according to Vernon, "cognitive confusion is the 'fundamental and basic characteristic of reading disability,' then clearly the cognitive processes of beginning readers must be the central concern of reading teachers seeking to prevent disability through any such confusion." This

consideration led to the formalization of the Cognitive Clarity Theory of learning to read which has been set out in greater detail in several previous articles, for example, Downing (1972 a). Very briefly, the theory states that, because reading and writing behavior has only existed in the human species (except for a tiny elite proportion) for little more than one hundred years, it is genetically impossible that any specific organ or area of the brain could have evolved for the reading process. Therefore, reading and writing and learning these skills must employ processes in the central nervous system that are used for more general functioning. Most learning of skills in early childhood begins in imitation, but unlike many other skills, it is impossible to imitate the essential actions of a reader. The young child cannot see for himself what the reader is doing or why he does it. This obscurity of action and purpose causes the young child to enter the first phase of learning the skill of reading in a state of cognitive confusion. He does not understand the functions of reading and writing, he does not know what actions he is supposed to perform, and he lacks concepts of the elements of spoken language which are coded by the writing system. According to Downing (1973b), "the fundamental basis of learning to read would seem to be the movement from this state of cognitive confusion to one of increasing cognitive clarity. The learning-to-read process, therefore, is a problem-solving process in which the child gradually acquires more and more of the necessary linguistic concepts, and an increasing understanding of the purpose and mechanism of the reading act."

At the 1971 meeting of the National Reading Conference, a summary of evidence related to the Cognitive Clarity Theory was presented (Downing,

1972b). In that article eleven previous investigations were cited in support of the theory, and its more general explanatory power for coping with a number of paradoxes of reading research was demonstrated. Subsequently, one further important investigation has been published which should be noted here.

Hazel Francis (1973) conducted a series of tests of language concepts, vocabulary, and reading achievement of 50 boys and girls in a primary school at Leeds, England. Her highest correlation (.41) was between reading and the technical vocabulary of language. When Francis statistically controlled general vocabulary skill the correlation was still considerable (.34), "indicating that factors independent of a general ability to deal with abstract concepts were involved in learning technical vocabulary, and that these were closely related to the reading process." Francis' finding provides further evidence that there are specific concepts of language which are important in learning to read. These concepts are reflected in the technical vocabulary of reading, or what linguists might term "the reading instruction register." The development of such concepts is the essence of the cognitive phase of learning the skills of reading and writing.

Aim

The aim of the present investigation was to test a hypothesis derived from the Cognitive Clarity Theory in rather unusual though natural environmental conditions. In the Canadian province of British Columbia there are a number of bands of North American Indians. This present study compares Indian and non-Indian children in two localities. The two Indian bands

will not be identified in this publication for ethical reasons. All the children were attending kindergarten.

The Indian children in both bands have different backgrounds from the non-Indian children in a number of respects. Of concern to the theory is the fact that the Indian children come from a culture with no tradition of written language. Their homes are generally poorer economically and reading materials are very rare in them. Their parents are less conscious of the act of speaking and they have little or no recourse to writing. Their Indian languages are dead, except in a few of the oldest men and women in the bands. The children and their parents speak a form of English.

The non-Indian children,in contrast, live in homes where written or printed English is more common. Their culture is traditionally literate. Their parents read and write and some talk about these activities.They are more aware of such things as "correct" speech and spelling and these are sometimes a topic of conversation.

The Cognitive Clarity Theory of reading would predict that these two different environments should influence the level of cognitive confusion of children entering kindergarten. More formally, it is hypothesized that, in comparison with these Indian children, the non-Indian children should show significantly superior performance on objective tests of cognitive clarity in learning to read.

Method

The kindergarten children studied came from two school districts in the north of British Columbia. In area I all the Indian boys and girls were tested. These were compared with a sample of non-Indian boys and

girls selected by random procedures. In area II the same sampling procedure was followed. Details of the numbers of children tested in each category are given in Table 1.

Five subtests of the Canadian Reading Readiness battery were administered. This test is experimental. It has been described in detail by Evanechko, Ollila, Downing, and Braun (1973). Here, a brief summary of the five subtests seems appropriate:

1. Orientation to literacy. Six items are used to determine the child's understanding of the communication purpose of literacy. On each item, the child must select pictures which illustrate the purpose and reject those which are irrelevant.

2. Understanding literacy behavior. This subtest has six items designed to find if the child can recognize reading and writing activities. The child must select pictures illustrating "reading" or "writing" and reject others which are non-exemplars of these concepts.

3. Technical language of literacy. This consists of twelve items designed to measure the child's knowledge of technical linguistic concepts such as "letter," "word," "number," etc. For example, the child must find each object which is a "word" in a row of various printed items.

4. Visual letter recognition and letter-name knowledge. Twenty-one items measure the child's ability to discriminate and recognize visually upper and lower case letters in relation to their letter-names.

5. Initial phonemes. This subtest comprises nineteen items in which the child selects a picture the name of which has the same initial phoneme as another picture specified by the tester.

The subtests are all paper and pencil tests which are administered as group tests. The maximum size of group was fixed at 15.

Results

The mean scores on each subtest for Indian and non-Indian boys and girls for each of the two areas are shown in Table 1. These data were

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treated in a 2(culture) X 2(sex) X2(area) multivariate analysis of variance for the five dependent measures, the results of which are shown in Table 2. These show that the scores of

- - - - - - - - - [INSERT NEAR HERE TABLE 2] - - - - - - - - - - - - -

the Indian children were significantly inferior to those of the non-Indian children on every measure at at least the one per cent level of confidence (on four out of five measures $p < .001$).

Only the cultural factor was significant. There were no significant differences between the two areas or between boys and girls, and no significant interactions either.

Discussion

These results support the hypothesis derived from the Cognitive Clarity Theory of learning to read. The children from the culture which provided less experience of literacy behavior and less awareness of the act of speech showed much greater cognitive confusion about reading and writing. They were significantly less able to recognize the acts of "reading" and "writing." Their concepts of the communicative function of reading and writing were significantly immature. Their

concepts of such parts of language as "word" and "letter" were significantly more confused. Their ability to recognize and name letters was significantly poorer. Their "phonematic hearing" (cf, Elkonin, 1973) was significantly less well developed. These findings provide still another demonstration of the general applicability of the Cognitive Clarity theory.

The implications of this theory for classroom practice are again apparent from this research. Cognitive clarity regarding the functions and task activities of the skills of literacy is likely to be enhanced in an environment which provides experiences to stir the child's curiosity and give him sufficient reliable information for discovery of the appropriate linguistic and technical concepts. Children's home backgrounds vary in such provisions. The ultimate outcome in the cognitive phase of skill development depends largely on the resources and planning of teachers seeking to insure the provision of sufficient reliable information for concept development in early experiences of reading and writing activities.

The most important factor of all is the teacher's own clear understanding of the concepts involved in learning to read. Unfortunately, the training of teachers in this respect seems likely to have been inadequate and probably many teachers have not thought out what concepts children need to learn at the initial cognitive phase. Francis's (1973) article, for example, provides evidence that at the present time children have to learn these concepts in a situation resembling that of a non-swimmer who has been thrown in at the deep end of a swimming pool.

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Table 1

Mean Reading Readiness Subtest Scores for Indian and Non-Indian Children of Both Sexes in Two Areas of B. C., Canada

	Area I			
	Indian Boys (n = 30)	Indian Girls (n = 29)	Non-Indian Boys (n = 38)	Non-Indian Girls (n = 28)
Orientation to Literacy	1.53	1.31	1.74	1.79
Understanding Literacy Behavior	1.43	1.62	2.45	2.61
Technical Language of Literacy	1.53	3.31	6.37	7.54
Visual Letter Recognition and Letter-name Knowledge	5.20	8.41	11.53	11.96
Initial Phonemes	5.47	6.27	8.58	8.96

	Area II			
	Indian Boys (n = 6)	Indian Girls (n = 7)	Non-Indian Boys (n = 17)	Non-Indian Girls (n = 9)
Orientation to Literacy	1.17	0.71	1.76	1.67
Understanding Literacy Behavior	1.17	1.14	2.00	2.77
Technical Language of Literacy	1.00	3.14	5.65	4.89
Visual Letter Recognition and Letter-name Knowledge	4.33	7.85	9.82	11.22
Initial Phonemes	6.00	3.71	6.52	7.89

Table 2

Multivariate and Univariate Tests of the Effects of Culture on Reading Readiness Subtest Scores

Multivariate $F = 6.58$, $df = 5, 152$, $p < .001$

Univariate F-tests

Variable	MS	df	F	p<
Orientation to Literacy	8.17	1, 156	6.20	< .004
Understanding Literacy Behavior	32.77	1, 156	20.49	< .001
Technical Language of Literacy	391.94	1, 156	19.78	< .001
Visual Letter Recognition and Letter-name Knowledge	575.88	1, 156	19.93	< .001
Initial Phonemes	181.11	1, 156	10.24	< .001